Executive Summary

The Regional Wastewater Services Plan (RWSP) outlines a number of important projects, programs, and policies for King County to implement through 2030 to continue to protect public health and water quality and ensure sufficient wastewater capacity to meet future growth needs. In adopting the RWSP in 1999, the Metropolitan King County Council recognized the importance of reviewing the implementation of the RWSP on a regular basis. As a result, the council adopted specific RWSP reporting policies in March 2006 that call for regular reviews and updates associated with implementing the RWSP.[1]

The Wastewater Treatment Division (WTD) of the King County Department of Natural Resources and Parks (DNRP) has prepared the *RWSP 2005 Annual Report* in accordance with the RWSP reporting policies. The report presents the activities and accomplishments of implementing the RWSP in 2005. Highlights of the report are provided in this executive summary.

Brightwater Treatment System

The RWSP calls for building a third regional wastewater treatment plant by 2010, now known as 'Brightwater', to accommodate growth in the northern portion of King County's wastewater service area. The new facilities will include a 36 million gallons per day (mgd) treatment plant, conveyance (pipes and pumps that take the wastewater to and from the plant), and a marine outfall that will discharge effluent (treated wastewater) from the Brightwater Treatment Plant into Puget Sound. The Brightwater conveyance system consists of approximately 14 miles of pipeline built in underground tunnels.

The Brightwater project remains on schedule for completion in 2010. Significant efforts in 2005 included:

- Prepared a supplemental environmental impact statement to evaluate potential environmental impacts that could result if an earthquake were to damage Brightwater facilities at the treatment plant site.
- Initiated final design on the treatment plant and conveyance system, including additional value engineering review.
- Secured agreements with property owners to purchase all 25 treatment plant parcels and acquire 92 percent of conveyance parcels and easements.
- Acquired nearly all major permits needed for construction.
- Continued to involve the public and stakeholders in the design and permitting processes.

[1] The Metropolitan King County Council adopted specific RWSP reporting policies in May 2006 via Ordinance 15384. The RWSP annual report reporting policies are provided in Chapter 1 of this report.

- Developed and signed Project Labor Agreements with building and construction trades councils.
- Met the King County Council's provisos in the 2005 budget (monthly cost reports, baseline budget, hiring of oversight consultant).
- Incorporated a reclaimed water "backbone" into the design of the conveyance system.
- Negotiated mitigation agreements with Snohomish County and other affected jurisdictions.
- Developed a cost trend based on preliminary cost estimates for the treatment plant from the General Contractor/Construction Manager (GC/CM).[2]

More details on the Brightwater Treatment System and accomplishments in 2005 are provided in Chapter 2 of this report.

Conveyance System Improvements

King County's regional wastewater conveyance system consists of more than 335 miles of pipes and 42 pump stations that move wastewater from local communities to the county's two regional wastewater treatment plants. Improvements to the county's conveyance system are being made in accordance with RWSP policies to meet the 20-year design storm and accommodate increased flows where needed.

Work began in 2005 to update the conveyance system improvement (CSI) plan. The update is scheduled to be transmitted to the King County Council in early 2007. Efforts associated with the plan update include identifying capacity constraints, age and condition of facilities, and conveyance needs in the combined system that are not addressed in the combined sewer overflow control plan.

The RWSP conveyance projects in design during 2005 include the Bellevue Pump Station Upgrade, Kent/Auburn Conveyance System Improvements, Hidden Lake Pump Station Replacement and Sewer Improvement, and Soos Creek Improvements. The CSI projects in construction during 2005 include the Fairwood Interceptor Sewer, Juanita Bay Pump Station Replacement, and Pacific Pump Station Replacement.

More details on the RWSP CSI projects and accomplishments in 2005 are provided in Chapter 3 of this report.

[2] GC/CM is an alternative project delivery method in which the contractor provides input into the design. During design, the owner and GC/CM negotiate a guaranteed maximum price for project construction. The GC/CM then manages construction and acts as general contractor.

Infiltration and Inflow Program

The RWSP calls for improvements to reduce existing and future levels of infiltration and inflow (I/I) into local collection systems. I/I is clean stormwater and groundwater that enter the sewer system through cracked pipes, leaky manholes, or improperly connected storm drains, down spouts, and sump pumps. Most inflow comes from stormwater and most infiltration comes from groundwater. I/I affects the size of King County conveyance and treatment systems and, ultimately, the monthly rates that businesses and residents pay to operate and maintain them.

A significant effort of WTD's I/I program in 2005 was the completion of a joint county/local agency comprehensive six-year study of I/I in the portions of the regional wastewater service area served by separated sewers. Based on the results of the study, the King County Council approved the *Executive's Recommended Regional Infiltration and Inflow Control Program* in May 2006. The recommendations represent the consensus reached by the county and the local agencies that send wastewater flows to the county's regional system for treatment and disposal.

The I/I program recommendations reflect the need to cost-effectively remove enough I/I from the collection system to delay, reduce, or eliminate some otherwise needed conveyance system improvement projects. The recommendations also reflect the need to maintain I/I reductions long-term to prevent future increases in I/I throughout the regional system. Long-term I/I control includes policy, administrative, financial, and technical measures that promote an ongoing program of review, maintenance, and repair of the collection and conveyance system.

More information on the I/I program and accomplishments in 2005 are provided in Chapter 4 of this report.

Combined Sewer Overflow Control

The RWSP calls for the control of all county combined sewer overflows (CSOs) by 2030.[3] The RWSP CSO control policies also call for development of a long-range sediment management strategy to prioritize cleanup of contaminated sediments at specific CSO locations.

More information on the 2005 accomplishments associated with the CSO control program, sediment management program, and efforts to improve water and sediment quality in the Lower Duwamish Waterway is provided in Chapter 5.

CSO Control Program

CSOs are events where untreated wastewater and stormwater from combined sewers discharge directly from outfall pipes into water bodies during heavy rainstorms when sewers are full.

[3] The Washington State Department of Ecology (Ecology) regulates the level of CSO control based on the number of untreated CSO events that occur in a year. Ecology defines "the greatest reasonable reduction" in CSOs (RCW 90.48) as being "control of each CSO in such a way that an average of one untreated discharge may occur per year" (WAC 173-245-020).

Combined sewers, which carry both wastewater and clean stormwater, exist in many parts of older cities across the nation, including Seattle. To protect treatment plants and avoid sewer backups into homes, businesses, and streets, combined sewers in Seattle sometimes overflow at specific locations (CSOs) into Puget Sound, the Duwamish Waterway, Elliott Bay, Lake Union, the Lake Washington Ship Canal, and Lake Washington. Although the wastewater in CSOs is greatly diluted by stormwater, CSOs may be harmful to public health and aquatic life because they can carry chemicals and disease-causing pathogens.

Many of these CSOs have been controlled through construction of CSO control facilities, which began in the late 1970s. Since 1988, when monitoring and measuring of CSO flows began, these control efforts have reduced CSO volumes by nearly 60 percent, from an estimated 2.4 billion gallons per year to approximately 900 million gallons per year.

Key achievements of the CSO control program in 2005 include completion and startup of the Mercer/Elliott West and Henderson/Norfolk CSO control systems and completion of substantial portions of the CSO program review, which was transmitted to the King County Council in spring 2006. The review confirmed the control strategies and schedules put forth in the RWSP. Further work will be done to assess CSO treatment technologies and to update the hydraulic model used to predict the effectiveness of CSO control. Results of these and other efforts, recommendations stemming from the results, and updated cost estimates for the program will be presented in the next program review, scheduled for 2010.

Lower Duwamish Waterway Superfund Site

King County continues to work to improve water quality in the Lower Duwamish Waterway through actions such as reducing CSOs, restoring habitats, capping and cleaning up sediments, and controlling toxicants from industries and stormwater runoff. WTD is partnering in an arrangement known as the Lower Duwamish Waterway Group (LDWG) with the City of Seattle, the Port of Seattle, and the Boeing Company under a consent agreement to prepare a remedial investigation and feasibility study for cleaning up sediments in the Lower Duwamish Waterway Superfund Site. This effort is in coordination with the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology). The field studies needed to complete the remedial investigation have been finished. Work is under way on the feasibility study that will outline alternatives for the final cleanup of the site. The work on the feasibility study is expected to be complete by the end of 2007.

The LDWG is committed to undertaking four early action sites, which will clean up portions of the waterway years earlier than required. The county is participating in two of the early action sites at Diagonal/Duwamish CSO/Storm Drain and Slip 4.

Sediment Management Program

WTD is carrying out a sediment management plan developed in the late 1990s to remediate sediment contamination near some county CSO outfalls. The sediment in these areas is contaminated with a variety of heavy metals (lead, copper, zinc), phthalates, polychlorinated

biphenyls (PCBs), and hydrocarbons. Most of the contamination occurred in the first half of the 20th century, before industrial pretreatment standards were enforced.

WTD continues to move forward with the sediment management plan and continues its collaboration with public and private agencies and organizations to address environmental concerns in the Duwamish Waterway. The *Duwamish/Diagonal CSO/SD Sediment Remediation Project Closure Repo*rt was issued in July 2005; this report describes the dredging, transport, disposal, and capping methods that were used at the Duwamish/Diagonal location between November 2003 and March 2004.

Local Treatment Systems

At the request of the Vashon Sewer District and the City of Carnation, and in accordance with RWSP policies, King County extended its wastewater service area to meet specific public health needs and to help manage the environmental impacts of growth in these communities. The county is currently upgrading the Vashon Treatment Plant and constructing a new treatment plant in Carnation.

More information on the efforts associated with the Vashon and Carnation treatment plants in 2005 is provided in Chapter 6 of this report.

Vashon Treatment Plant

In 1999, King County started to manage and operate the Vashon Sewer District's wastewater treatment plant. The Vashon Sewer District owns and maintains the collection system that delivers wastewater from about 425 residential and commercial customers in and around the island's main business area.

In 2004, the county began upgrading the Vashon Treatment Plant. The upgraded facility will have increased capacity and enhanced backup systems. Improvements include new headworks, an oxidation ditch, two secondary clarifiers, a stormwater detention tank, an administration building, and an electrical building.

Construction in 2005 got off to a slow start because of the discovery of contaminated surface soils on site. The contaminants were likely deposited by fallout from the smokestacks of the Asarco Copper Smelter in Ruston, which operated from 1890 to 1996. After a soil management plan was developed and implemented, construction resumed in April 2005. Construction is expected to be complete in late 2006.

Carnation Treatment Plant

In 2002, the City of Carnation contracted with King County to design, build, operate, and maintain a new treatment plant and associated discharge facilities to replace onsite septic systems. The city will design, build, and operate the local wastewater collection system.

Several milestones were achieved in 2005, including selection of the treatment plant design and issuance of a facilities plan. In addition, EPA prepared an Environmental Assessment and issued a Finding of No Significant Impact under the National Environmental Policy Act. Construction of the treatment plant will begin in fall 2006.

Odor Control Program

The RWSP includes policy guidance to achieve King County's odor control goal and to carry out an odor prevention program that goes beyond traditional odor control. The county's goal is to prevent and control nuisance odor occurrences at all treatment plants and associated conveyance facilities.

Phased improvements are under way at the West Point and South Treatment plants to control the most significant potential odor sources first. Design on improvements to the West Point Plant's existing odor scrubber system and changes to the division channel ventilation system were completed in 2005. Design was completed on covers for each first pass of the four aeration basins and for the return activated sludge channel at South Plant. Several projects are also in progress to improve odor problems in the conveyance system.

More information on the achievements of the Odor Control Program in 2005 is provided in Chapter 7 of this report.

Biosolids Program

The RWSP policies guide the county to continue to produce and market Class B biosolids and to evaluate alternative technologies to produce the highest quality marketable biosolids, including Class A biosolids.[4,5] Biosolids are the nutrient-rich organic material produced by treating wastewater solids. After processing and treatment, they can be beneficially recycled as a fertilizer and soil amendment.

WTD continued to produce Class B biosolids at the county's regional treatment plants. Approximately 115,000 wet tons of biosolids were produced in 2005, all of which was recycled as a soil amendment in forestry and agricultural applications and to make compost.

More information on the Biosolids Program's accomplishments in 2005 is provided in Chapter 8 of this report.

[4] Class B biosolids refer to biosolids that have been treated to significantly reduce pathogens to levels that are safe for beneficial use in land application.

[5] Class A biosolids refer to biosolids that have been treated to reduce pathogens to below detectable levels. Biosolids that meet this designation can be used without site access or crop harvest restrictions, and are exempt from site specific permits. Federal regulations require Class A quality for biosolids that are sold or given away in a bag or other container, or applied to lawns or home gardens.

Reclaimed Water[6] and Water Conservation

RWSP water reuse policies call for the county to pursue the use of reclaimed water and to develop a water reuse program. Water reuse is also a component of the RWSP treatment plant policies.

WTD's regional treatment plants produced and used about 266 million gallons of reclaimed water in 2005 for landscape irrigation, internal plant reuse, and other non-drinking purposes. WTD moved ahead on predesign of a project to supply reclaimed water to the Sammamish Valley using conveyance lines from the Brightwater Treatment Plant. This project is known as the Brightwater reclaimed water backbone. More information on this effort is included in Chapter 2 of this report.

The RWSP policies also recognize the importance of supporting water conservation efforts. DNRP extended its water conservation program for an additional year to complete several projects that were started in 2005. In addition, DNRP continued its efforts to install water conserving fixtures for specific projects.

More information on the efforts in 2005 associated with the reclaimed water and water conservation programs is provided in Chapter 9 of this report.

RWSP Cost Estimates

RWSP reporting policies call for including in the RWSP annual reports an update of anticipated RWSP costs through the year 2030. Estimates of RWSP costs were first prepared in 1998 and then updated in 2003. The 2003 RWSP estimates were included in the *2004 RWSP Update*.[7] In addition to updating the cost of projects included in the 1998 estimate, the 2003 cost estimates included anticipated costs for projects and programs that resulted from implementing RWSP policies but that were not identified or included in the 1998 RWSP cost estimates. Such projects included the construction of the Carnation Treatment Plant, upgrades to the Vashon Treatment Plant, odor control improvements at West Point plant and South plant, and acquisition of and improvements to Snohomish County interceptors.

Cost estimates were updated in 2005. The 2005 cost estimate for implementing the projects and programs associated with the RWSP through 2030 is approximately $2.97 billion, an increase of $212 million from the 2003 RWSP cost estimate of approximately $2.76 billion in 2005$ dollars. The 2005 Brightwater cost trend estimates described in Chapter 2 of this report account for 89 percent ($189 million) of this increase.

The RWSP 2005 cost estimates include preliminary estimates for projects that are planned for the future, costs for projects that are in predesign, costs for projects that are in final design and construction, and costs for completed RWSP projects. Scopes and estimated costs for projects that are planned further out could change as more detailed information becomes available over

[6] King County's Reclaimed Water Program was formerly called the Water Reuse Program.
[7] The *2004 RWSP Update* is available on the Web at http://dnr.metrokc.gov/wtd/rwsp/library.htm#3yrupdate

time. Generally, cost estimates become less variable as projects near final design and construction.

The 2005 RWSP cost estimates, shown in Table 10-1 in Chapter 10 of this report, are based on the capital projects that were included in the 2003 cost estimate and RWSP projects that were identified after 2003. The 2005 RWSP cost estimates include adjustments for inflation, including cost increases that have occurred as the result of unforeseen circumstances such as the recent increases in global commodities. The 2005 estimates also reflect modifications to projects resulting from information gathered through flow monitoring, modeling, and cost analysis after 2003.

More details on the 2005 RWSP cost estimates are provided in Chapter 10 of this report.

Water Quality Management and Compliance

The RWSP water quality protection policies guide King County in identifying and resolving regional water quality issues, protecting public and environmental health, and protecting the public's investment in wastewater facilities and water resource management. The policies recognize that research and analysis are required and will be used to evaluate water quality of water bodies in WTD's wastewater service area.

To meet the water quality protection policies and protect public health, King County regularly monitors its major lakes, beaches, streams, marine waters, and wastewater effluent. In 2005, King County's wastewater treatment plants continued to be in compliance with the terms and conditions of their NPDES (National Pollutant Discharge Elimination System) permits.[8]

The Industrial Waste and Local Hazardous Waste Management Programs continue to work to control pollutants at their source, thereby keeping them out of the wastewater system and, in turn, out of surface waters and the environment. In 2005, the Industrial Waste Program (IWP) issued 129 permits and 288 industrial waste discharge authorizations and conducted 435 inspections. IWP continued to work on the Lower Duwamish Waterway (LDW) Source Control Project in support of the WTD's Sediment Management Program. In addition, IWP evaluated the area's biotechnology industry to assess the need to develop a streamlined permitting process to assist biotechnology facilities in meeting local, state, and federal discharge regulations.

The Local Hazardous Waste Management Program (LHWMP) is a consortium of the King County DNRP (the Water and Land Resources Division and the Solid Waste Division), the City of Seattle (Seattle Public Utilities), Public Health–Seattle & King County, and the Suburban Cities Association. The program provides technical assistance, reimbursement, and recognition to businesses that generate small quantities of hazardous waste. It also provides collection services for household hazardous wastes as well as public education aimed at proper handling and reduction in use of hazardous household products.

[8] NPDES permits are issued by Ecology and set limits on the quality and quantity of effluent (treated wastewater) discharged from point sources such as treatment plants, CSOs, and industrial facilities.

One service of the LHWMP is the EnviroStars Program, which provides businesses incentives and recognition for reducing hazardous waste, while giving consumers an objective way to identify environmentally sound practices. In 2005, the program added 39 King County businesses to its roster, bringing the total in the county to 354 businesses.

In 2005, more than 80,000 customers used the program's facilities or services to dispose of more than 1,800 tons of household hazardous waste. If these services were not available, much of this waste could have ended up in regional landfills, sewers, storm drains, and the environment.

More information on King County's water quality management and compliance activities and accomplishments in 2005 is provided in Chapter 11 of this report.

In addition to providing information on water quality management and compliance, the RWSP reporting policies call for a summary of the previous year's water quality monitoring results. The water quality monitoring results for 2005 are provided as Appendix D. In general, monitoring activities in 2005 found that the quality of marine and fresh waters in King County is good.